

WHAT IS CLAIMED IS:

1 1. A method comprising:

2 in response to a first signal indicating the execution of  
3 a breakpoint by a processor, suspending execution of a  
4 peripheral and saving the state of the peripheral;

5 continuing execution of the breakpoint by the processor  
6 in response to receiving a second signal indicating that the  
7 state of the peripheral has been saved; and

8 restoring the saved state of the peripheral in response  
9 to a third signal indicating that execution of the breakpoint  
10 by the processor has been completed.

1 2. The method of claim 1 comprising resuming normal  
2 execution of the processor in response to a signal indicating  
3 that the saved state has been restored.

1 3. The method of claim 1 comprising resuming normal  
2 execution of the peripheral in response to a signal indicating  
3 that the processor has resumed normal execution.

1 4. The method of claim 1 comprising setting a register to  
2 control whether generation of the second signal is to be based  
3 on the state of the peripheral.

1 5. The method of claim 1 comprising setting a register to  
2 control whether generation of a signal indicating that the

3 saved state has been restored is to be based on the state of  
4 the peripheral.

1 6. The method of claim 1 comprising triggering the  
2 breakpoint in response to a condition associated with  
3 occurrence of an instruction being executed by the processor.

1 7. A system comprising:

2 a processor;

3 a first computer-readable medium storing instructions  
4 that, when applied to the processor, cause the processor to:

5 generate a first signal indicating execution of a  
6 breakpoint,

7 continue execution of the breakpoint in response to  
8 receiving a second signal, and

9 generate a third signal indicating that execution of  
10 the breakpoint has been completed;

11 a peripheral coupled to the processor;

12 a second computer-readable medium storing instructions  
13 that, when applied to the peripheral, cause the peripheral to:

14 suspend execution and save a state of the  
15 peripheral, in response to receiving the first signal,

16 restore the state of the peripheral, in response to  
17 receiving the third signal; and

18 a digital logic circuit to generate the second signal  
19 indicating that the state of the peripheral has been saved,  
20 the digital logic circuit coupled to the processor and the  
21 peripheral.

1 8. The system of claim 7 wherein the first computer-readable  
2 medium includes instructions that cause the processor to:

3 resume normal execution in response to receiving a  
4 fourth signal, and

5 generate a fifth signal indicating that the  
6 processor has resumed normal execution; and  
7 wherein the second computer-readable medium includes  
8 instructions that cause the peripheral to resume normal  
9 execution, in response to receiving the fifth signal; and  
10 wherein the digital logic circuit is configured to  
11 generate the fourth signal indicating that the saved state of  
12 the peripheral has been restored.

1 9. The system of claim 8, further comprising:

2 a second processor;

3 a third computer-readable medium storing instructions  
4 that, when applied to the second processor, cause the second  
5 processor to:

6 suspend execution and save a state of the second  
7 processor, in response to receiving the first signal,

8           restore the state of the second processor, in  
9           response to receiving the third signal, and  
10          resume normal execution, in response to receiving  
11          the fifth signal; and  
12          the digital logic circuit configured to:  
13               generate the second signal indicating that the state  
14               of the second processor has been saved, and  
15               generate the fourth signal indicating that the saved  
16               state of the second processor has been restored.

1   10.   The system of claim 7 including a system on a chip (SOC).

2   11.   The system of claim 7 including a debugging tool coupled  
3   to the system to debug the system.

1   12.   The system of claim 7 wherein the digital logic circuit  
2   comprises a register to control whether generation of the  
3   second signal is to be based on the state of the peripheral.

1   13.   The system of claim 7 wherein the state identifies a  
2   state of internal registers associated with the peripheral.

1   14.   The system of claim 7 wherein the processor operates at a  
2   clock rate different than the peripheral.

3   15.   An apparatus comprising:

4 a processor having a computer-readable medium storing  
5 instructions that, when applied to the processor, cause the  
6 processor to:

7 generate a signal indicating execution of a  
8 breakpoint,

9 continue execution of the breakpoint in response to  
10 receiving a signal indicating that the state of a  
11 peripheral has been saved, and

12 generate a signal indicating that execution of  
13 the breakpoint has been completed.

1 16. The apparatus of claim 15 wherein the computer-readable  
2 medium includes instructions that cause the processor to  
3 resume normal execution in response to a signal indicating  
4 that the saved state has been restored.

1 17. An article comprising a computer-readable medium that  
2 stores computer-executable instructions for causing a computer  
3 system to:

4 generate a signal indicating execution of a  
5 breakpoint;

6 continue execution of the breakpoint in response to  
7 receiving a signal indicating that the state of a  
8 peripheral has been saved; and

9           generate a signal indicating that execution of  
10       the breakpoint has been completed.

1       18. The article of claim 17 wherein the computer-readable  
2       medium stores computer-executable instructions for causing a  
3       computer system to resume normal execution of the processor in  
4       response to a signal indicating that the saved state has been  
5       restored.

1       19. An apparatus comprising:

2           a peripheral having a computer-readable medium storing  
3       instructions that, when applied to the peripheral, cause the  
4       peripheral to:

5           suspend execution and save a state of the  
6       peripheral, in response to receiving a signal indicating  
7       execution of a breakpoint, and

8           restore the state of the peripheral, in response to  
9       receiving a signal indicating that execution of the  
10      breakpoint has been completed.

1       20. The apparatus of claim 19 wherein the computer-readable  
2       medium includes instructions that cause the peripheral to  
3       resume normal execution of the peripheral in response to a  
4       signal indicating that a processor has resumed normal  
5       execution.

6 21. An article comprising a computer-readable medium that  
7 stores computer-executable instructions for causing a computer  
8 system to:

9 suspend execution and save a state of the  
10 peripheral, in response to receiving a signal indicating  
11 execution of a breakpoint, and

12 restore the state of the peripheral, in response to  
13 receiving a signal indicating that execution of the  
14 breakpoint has been completed.

1 22. The article of claim 21 wherein the computer-readable  
2 medium stores computer-executable instructions for causing a  
3 computer system to resume normal execution of the peripheral  
4 in response to a signal indicating that a processor has  
5 resumed normal execution.

1 23. An apparatus comprising:

2 one or more signal lines used to receive signals and to  
3 send signals; and

4 a processor configured to:

5 generate a signal indicating execution of a  
6 breakpoint,

7 continue execution of the breakpoint in response to  
8 receiving a signal on a signal line indicating that the  
9 state of a peripheral has been saved, and

10           generate a signal on a signal line indicating that  
11           execution of the breakpoint has been completed.

1    24.   The apparatus of claim 23 wherein the processor is  
2           configured to resume normal execution in response to a signal  
3           indicating that the saved state has been restored.

1    25.   An apparatus comprising:

2           one or more signal lines used to receive signals and to  
3           send signals; and

4           a peripheral configured to:

5                 suspend execution and save a state of the  
6                 peripheral, in response to receiving a signal indicating  
7                 execution of a breakpoint, and

8                 restore the state of the peripheral, in response to  
9                 receiving a signal indicating that execution of the  
10                breakpoint has been completed.

1    26.   The apparatus of claim 25 wherein the peripheral is  
2           configured to resume normal execution in response to a signal  
3           indicating that a processor has resumed normal execution.